California High-Speed Train Project

TECHNICAL MEMORANDUM

High-Speed Train Station Descriptions
TM 2.2.5

Prepared by:	*Signed document on file* Gary Newgard, RA	18 July 11 Date
Checked by:	*Signed document on file* John Chirco, PE	31 May 11 Date
Approved by:	*Signed document on file* Ken Jong, PE, Engineering Manager	27 Sep 11 Date
Released by:	*Signed document on file* Hans Van Winkle, Program Director	18 July 12 Date

Revision	Date	Description
0	18 July 11	Initial Release

Note: Signatures apply for the latest technical memorandum revision as noted above.

Prepared by PARSONS BRINCKERHOFF

for the California High-Speed Rail Authority

System Level Technical and Integration Reviews

The purpose of the review is to ensure:

- Technical consistency and appropriateness
- Check for integration issues and conflicts

System level reviews are required for all technical memorandums. Technical Leads for each subsystem are responsible for completing the reviews in a timely manner and identifying appropriate senior staff to perform the review. Exemption to the System Level technical and integration review by any Subsystem must be approved by the Engineering Manager.

System Level Technical Reviews by Subsystem:

Environmental:	*Signed document on file* Ann Koby	12 July 11 Date
Program:	*Signed document on file* Gregg Albright, Deputy Program Director	12 July 11 Date
Systems:	NOT REQUIRED Print Name:	 Date
Operations:	NOT REQUIRED Print Name:	 Date
Maintenance:	NOT REQUIRED Print Name:	 Date
Rolling Stock:	NOT REQUIRED Print Name:	 Date
Project Management Oversight:	*Signed document on file* Michael D. Lewis, PE	25 June 2012 Date

Note: Signatures apply for the technical memorandum revision corresponding to revision number in header and as noted on cover.

TABLE OF CONTENTS

ABSTRACT

This memorandum provides a preliminary system-wide technical and visual description of CHSTP stations including the following:

- Phase I intermediate stations constructed for high-speed passenger trains, located at Millbrae-SFO, Mid-Peninsula, San Jose, Gilroy, Fresno, Kings/Tulare Regional, Bakersfield, Palmdale, Sylmar/San Fernando and Norwalk/Fullerton.
- Phase I temporary terminal station at Merced.
- Phase I terminal stations in San Francisco, Los Angeles, and Anaheim.
- Phase II intermediate stations at Stockton, Modesto, Industry, Ontario Airport, Riverside, Temecula/Murrieta, Escondido, and University City.
- Phase II terminal stations at Sacramento and San Diego.

1.0 INTRODUCTION

1.1 PURPOSE OF THIS TECHNICAL MEMORANDUM

This memorandum provides a preliminary system-wide technical and visual description of CHSTP stations including the following:

- Phase I intermediate stations constructed for high-speed passenger trains, located in Millbrae-SFO, Mid-Peninsula, San Jose, Gilroy, Fresno, Kings/Tulare Regional, Bakersfield, Palmdale, Sylmar/San Fernando and Norwalk/Fullerton.
- Phase I temporary terminal station at Merced.
- Phase I terminal stations in San Francisco, Los Angeles, and Anaheim.
- Phase II intermediate stations at Stockton, Modesto, Industry, Ontario Airport, Riverside, Temecula/Murrieta, Escondido, and University City.
- Phase II terminal stations at Sacramento and San Diego.

Specific design considerations will be identified and described more fully by the responsible regional team.

1.2 STATEMENT OF TECHNICAL ISSUE

This document describes elements of station design which will comprise the basis of conceptual station layouts in the project-level environmental analysis.

1.3 DEFINITION OF TERMS

The following terms and acronyms used in this document have specific connotations with regard to this technical memorandum:

Authority	California High-Speed Rail Authority
CHST	California High-Speed Train
CHSTP	California High-Speed Train Project
CPTED	Crime Prevention through Environmental Design
HST	High-speed Train
LEED	Leadership in Energy and Environmental Design
NFPA	National Fire Protection Association
NIST	National Institute of Standards and Technology
NTD	Notice to Designers
RC	Regional Consultant
TM	Technical Memorandum

1.4 UNITS

The California High-Speed Train Project is based on U.S. Customary Units consistent with guidelines prepared by the California Department of Transportation and defined by the National Institute of Standards and Technology (NIST). U.S. Customary Units are officially used in the United States, and are also known in the U.S. as “English” or “Imperial” units. In order to avoid any confusion, all formal references to units of measure should be made in terms of U.S. Customary Units.

2.0 DEFINITION OF TECHNICAL TOPIC

Stations are the points of entry for passengers into the California High-Speed Train system and will dramatically influence their travel experience. Each station presents unique challenges which are to be addressed by regional teams. Station functionality, quality and safety are fundamental system-wide requirements. Specific purpose, context, presence and image will be defined individually for each station.

Station designs can be as varied as the communities into which they will be integrated. Each station must respond to unique, site-specific design factors including location, alignment, existing and future neighborhood architectural and historical context, anticipated ridership, climatic variations, vehicular and pedestrian station access, multi-modal transfer, protection from the elements, passenger orientation and familiarity, wayfinding, constructability and sustainability.

Design criteria for stations have been prepared under cover of TM 2.2.2 for Preliminary Design, and will be used as the basis for conceptual station layouts in the project-level environmental analysis. Specific architectural concepts will be presented during development of architectural concepts for individual stations.

3.0 ASSESSMENT / ANALYSIS

3.1 STATION LOCATIONS

Twenty-four stations are currently planned to serve residents and visitors along the length of the CHSTP corridor. Station locations are planned to serve areas of the state and within communities where high-speed train service will be most beneficial and highly utilized. Distances between stations vary between 12 miles and 115 miles. In some cases more than one station location is under consideration to serve an area or region, but only one of these sites will ultimately be selected.

3.2 DESIGN PARAMETERS

In the early planning and design of a CHST station, clear articulation of its intended purpose, context, presence and image are fundamental to developing an appropriate design solution for each of the stations. Design parameters are essential for each station in order to identify the station's design objectives and to evaluate design proposals. An architectural program must be developed by the regional consultants for each station which articulates station design parameters by addressing the following questions:

- **Purpose:** What are the purposes for building this station? Is it intended to be exclusively used as a railway station where passengers board and alight? Will it serve other functions such as interchange with air, rail, rapid transit, light rail, stadium, civic or cultural events? Will it become the hub of transit-oriented development or urban redevelopment? Will the station offer amenities for travelers including restaurants, coffee shops, newsstands, banking, and travel services? Is it intended to be a catalyst for future development and investment? Will the station provide for increased connectivity within an existing neighborhood?

- **Context:** What are the characteristics of the station's site? Is it in an historic downtown with character or in a neighborhood ready for redevelopment? Will its length and width necessitate demolition of existing buildings? Is it a modern economic hub with an eclectic blend of buildings? Is the infrastructure in place to support the transportation links serving the station? Is it an open site with little development and no preexisting visual context? Is it a vacation destination for domestic and international travelers? Is it densely or sparsely populated presently? Is it close to an international technology center?

- **Presence:** Will the station quietly blend into the urban/suburban fabric or will it become a prominent feature within its surroundings? Will extraordinary architectural character attract visitors to simply admire the station? Should the station convey a strong presence, visible from a distance as a local landmark? What kind of presence should it convey at night; bright and inviting lighting to draw users or an architectural statement of subtlety to blend into a residential context?

- **Image:** What does the community value the most about its environment, culture or heritage? Are these values to be expressed in the HST station? How does the community envision itself in twenty years or fifty years? What should the station building present to the state and the nation about itself; i.e., stability, history, tradition, innovation? Should the building image draw from the richness of its architectural context or convey a readiness to depart from the past? Is there a desire to present a world-class work of architectural innovation or a subtler work which blends into and complements the existing context? Should it convey its purpose as a railway station in the grand tradition of earlier eras?

Visualizations of stations and sites will be prepared at the appropriate phase of the Program with input from the affected stakeholders. Architectural planning through 30% Design will focus on functionality and general massing of the structures.

3.3 STATION CATEGORIES

Answers to the station design parameter questions posed in Section 3.2 may be found to a significant degree in the station locale. Some stations will be integrated into downtown city or regional centers while others will be located in the hearts of suburban communities, near airports or universities or even within semi-rural settings for which high-speed train service may serve as a catalyst for future growth and development. Each station will be responsive to the unique characteristics of its immediate environment. TM 2.2.3 describes categories of station types along the HST alignment, including the following:

- Global Center Station: located in densely populated economic centers
- Regional Center Station: located in a regional hub close to a global center
- City Center Station: located in an established, lower density urban downtown
- Suburban Center Station: located in a diverse, newer, outlying suburb
- Town Center Station: located in a small city which draws from regional centers

Refer to Appendix A Station Images for existing international high-speed train stations representative of each of these categories. These images are intended to illustrate that the perceived prominence or importance of a station location shall not be the determinant in the quality of architectural design. Rather, each station design will be the result of careful consideration of the characteristics and goals of the community into which it will be integrated.

3.4 LOCAL INPUT

All stations will satisfy the design guidelines developed in TM 2.2.2 and be designed through an iterative design process with the community. However, architectural treatment and approach will vary based on the level of local financial and development partnership between local agencies and the Authority. All stations will be designed and constructed to meet goals of design excellence and recognize local context as well as meet functional requirements of the high-speed train system. At a minimum, stations will be enclosed in a unique but architecturally reserved skin, conveying architectural subtlety while featuring striking interior spaces.

Local agencies desiring a more dynamic and impactful level of architecture may chose to partner with the Authority to develop an architecturally ‘iconic’ station. Any station could be classified an iconic station and may be characterized by a sense of prominence on the site, architectural expressiveness, exhilarating passenger experience, organic or curvilinear forms, unique detailing and/or uncommonly rich materials.

3.5 STATION DEVELOPMENT POLICY

The Authority’s objectives for station location and development around stations are stated in the CHST Final Program EIR/EIS document, section 6B HST Station Area Development. Station area development principles draw upon successful transit-oriented development strategies. HST stations will encourage higher density development; a mix of land uses and housing types; compact pedestrian-oriented design; context-sensitive building design that considers relation to public spaces; and limits on the amount of parking.

3.6 STATION PARKING POLICY

As stated in the Authority’s Station Area Parking Guidance document, the Authority intends to include all parking identified as necessary for the HST project in NEPA and CEQA decisions and other regulatory findings. Moreover, the Authority has adopted a policy that specifies that parking at all stations is to be provided at market rates. This should provide sufficient financial incentive for local jurisdictions and/or private operators to build needed parking facilities for serving HST users, including structured parking that the Authority would prefer. The Authority will work with the jurisdictions to identify sources of capital, financing methods, the implementation of public-private

partnerships and other means to facilitate the construction of needed parking. The property acquisition cost for structured parking at the station will be considered by the Authority to be part of project costs.

As the project development process evolves and enters into final design and construction, coordination activities will continue through:

Coordinating with local/regional transportation providers to integrate the HST station with existing and future planned transportation services to reduce parking demand, and.

Implementing its mitigation commitments identified in the program-level environmental documents as well as any additional commitments identified in the project-level EIR/EIS.

3.7 STATION ACCESS

Access to stations is a prime consideration in locating and positioning a station. CHST passengers need clear and direct access from local thoroughfares to the station via feeder streets. Passengers may arrive by various modes of transportation including light rail, bus, taxi, private car, bicycle, on foot as well as other modes of rail travel at selected stations. In close proximity to station entrances there may be sidewalks, bike paths, bus stops, taxi stands, kiss and rides, and surface and/or structured parking. Access modes will be prioritized as follows, from highest to lowest: pedestrians, bicycles, bus services and connecting rail systems, pick-up and drop-off (taxis and personal cars), and park-and-ride. Station entrances/exits will be oriented towards these various modes of station access.

3.8 PATRONAGE AND STATION SIZE

CHST stations will be integrated into existing urban or suburban built environments. Station size and architectural presence will vary from station to station; each will be uniquely sized to accommodate the projected ridership, future growth, frequency of trains during peak times on typical days, and anticipated surges of passengers during special events.

Station footprint and height are influenced by the following primary technical factors:

- Train length: the primary determinant of platform length
- Platform type and number: determined by operational needs
- Track count: a station with more tracks will be wider
- Station function: determined by operational needs, terminal or intermediate functioning
- Vertical configuration: elevated, at-grade or underground platforms will influence overall station height
- Patronage: station circulation space, waiting areas, and passenger service facilities are proportionate to projected passenger loads i.e. more passengers necessitate more circulation area. Circulation areas should provide a pedestrian level of service (LOS) B or better during normal peak periods
- Fare collection: method for separating paid and unpaid patrons
- Internal interchange with other transit systems: transferring passengers increase the needs for passenger circulation areas and shared facilities with bus, BRT and other rail providers
- Future commercial provisions: adjacent or integrated retail space will attract patrons
- Site context: zoning and existing buildings will influence station massing

3.9 STATION FOOTPRINT AND VERTICAL CONFIGURATION

Standard 1410-foot station platforms length may be configured in one of three ways relative to street level: elevated, at-grade or underground. Vertical configuration for a given station location is determined by function, alignment, interfaces with existing and proposed infrastructure, operational factors, safety, environmental impact and cost.

The station concourse will accommodate passenger functions such as ticketing, meeting and greeting, waiting, passenger and staff circulation, fare collection, vertical circulation, non-public

staff and plant spaces. Concourses may be separated from the platforms on an adjacent site, under the platforms or above the platforms. Terminal stations will often be larger than intermediate stations to accommodate additional tracks and platforms as well as higher ridership and specialized terminal staff and service spaces.

Alternative station locations and configurations that are evaluated in the environmental documents are to be included in the Environmental Document Text (see Section 6.0)

3.10 STATION SUPPORT / MECHANICAL / ELECTRICAL / FIRE PROTECTION FACILITIES

Other station spaces and facilities will be required to support operation of the station as well as the operation of high-speed trains. These include passenger services and station operations offices, ancillary spaces, station building service and standard plant spaces, and CHST system facilities. Facilities range from ticketing offices and train crew locker rooms to electrical substations, generators, fuel storage tanks, and chiller plants. While most of these facilities will be located within the station envelope, some may be located elsewhere on the station site.

Some equipment in stations will periodically require replacement; therefore access to equipment must be provided for future removal and replacement. Access may be provided horizontally via adjacent tracks or service road, or vertically through hatches to street level.

3.11 FUNCTIONAL CONSISTENCY AND VARIABILITY

While many elements of station design will be unique solutions to an individual station, site, and community conditions, other elements will be consistent amongst all stations. Consistency between stations facilitates passenger orientation and user friendliness. Functionally consistent elements include the passenger circulation sequence, platform length, ticket sales office location and identity, the fare collection and train boarding process, escalators and elevators, fare collection equipment, communication systems, signage and graphics, passenger information systems, and some specialized finishes.

3.12 SAFETY AND SECURITY

Safety of station patrons and staff is the first priority in station design. Stations should be designed to reflect the principles of CPTED (Crime Prevention through Environmental Design) including defensible space, natural surveillance, natural access control, and territorial reinforcement. Stations will have monitoring systems including seismic, climatic, CCTV and intrusion detection. Station infrastructure, including lighting, mechanical, electrical and power, and fire protection, will be designed with safety and security measures.

3.13 ACCESS CONTROL

Stations will be closed and secured outside of normal revenue hours. Care will be taken in the station design to enclose all portions of stations at ground level and provide access only to authorized staff and emergency personnel. The vertical platform configuration will be a primary determinant in the method of securing the stations, recognizing that platforms will generally be ventilated naturally whereas concourses will be heated and air conditioned in many cases. For at-grade platforms, access control will be achieved through the use of architectural screens and fencing. For elevated platforms, ground-level concourses will generally be environmentally controlled and therefore walls, windows and doors will provide the desired intrusion protection.

During revenue hours, access to platforms will be controlled. Departing passengers may be held back from the platforms until a predetermined time in advance of boarding. Platforms will only be open to those with a valid ticket.

3.14 EMERGENCY PROVISIONS/ FIRST RESPONDER ACCESS

Stations will be designed in accordance with National Fire Protection Association (NFPA) 130. Accordingly, emergency response to a station emergency event will be according to a pre-

approved emergency plan. Emergencies may include a fire or smoke condition within the station's public or non-public areas, a train collision or derailment, loss of station or traction power, necessity to evacuate passengers, a disabled or stalled train at a platform, natural disaster, presence of hazardous materials, passenger need for first aid, an earthquake or other events.

In the event of an emergency, the first responders may require access into all areas in or around the station. At least one entrance will be designated as an emergency entrance. Station design shall incorporate provisions as required by the state fire marshal and local fire jurisdiction to allow firefighter's access, i.e., dedicated firefighter's entrances, stairs or other.

Station plans will demonstrate acceptable strategies for emergency access as well as emergency evacuation.

3.15 NOISE, VIBRATION AND ACOUSTICS

Noise and vibration generated by the trains, patrons, external sources, and building systems should be controlled and reduced through quality station design. Appropriate mitigations will be considered both inside the station and adjacent to it. These mitigations include a noise and wind screen at intermediate stations that will separate patrons on platforms from trains operating on pass-through tracks. The screen will run the length of the platform and be located between through and stopping tracks. Interior public spaces will be acoustically treated to dampen objectionable noise.

3.16 TRACKWAY

Architectural station design does not stop at the ends of platforms. Beyond the ends of elevated platforms, the trackway and supports will be considered significant design elements and will be designed with attention to architectural detail while satisfying critical structural criteria. Trackway columns will be articulated, and the careful use of chamfering, reveals, rounding and profiling will demonstrate architectural concern for all aspects of the infrastructure. Horizontal elements including acoustic screens and girders supporting the tracks will likewise be tapered and detailed to convey concern for the surrounding environment.

3.17 SUSTAINABILITY

The California High-Speed Rail Authority is committed to building a high-speed train system that minimizes impacts to the natural and built environment, encourages compact land development around transit stations, and helps California manage pressing issues including climate change, traffic and airport congestion and energy dependency. CHST stations and corresponding sites will be planned, designed, constructed and operated at a LEED 'Silver' or better standard in line with state policy. LEED Silver certification should be sought for stations, the operations control center, and maintenance facilities.

4.0 SUMMARY AND RECOMMENDATIONS

See 'Section 6.0 Environmental Document Text' for complete text to be incorporated into regional environmental documents. In summary, regional consultants shall identify the following at each station:

- station design parameters and design objectives
- station types applicable to their area
- land development potential in and around the station
- primary travel modes at the station
- station footprint
- station vertical configuration
- station safety concerns
- sensitive light receptors adjacent to the station
- generators of noise and vibration adjacent to the station
- elevated trackways required beyond ends of the station

5.0 SOURCE INFORMATION AND REFERENCES

1. CHSRA Adopted HST Station Development Policies. May 14, 2008.
2. CHSTP Design Basis Document – California High-Speed Rail Program – High-Speed Rail System Design Comparison
3. CHSTP Basis of Design Policy – California High-Speed Train Project – January 2008.
4. CHSTP Technical Memorandum TM 2.2.2 – Station Program Design Guidelines
5. CHSTP Technical Memorandum TM 2.2.3 – Station Site Design Guidelines
6. CHSTP Technical Memorandum TM 2.2.4 – Station Platform Geometric Design
7. CHSTP Technical Memorandum – Station Area Parking Guidance
8. Fruin, John J. Pedestrian Planning and Design. Elevator World, Inc. 1987.
9. NFPA 130 Standard for Fixed Guideway Transit and Passenger Railway Systems 2010 Edition
10. Americans with Disabilities Act (ADA) Accessibility Guidelines for Buildings and Facilities. 2004.

6.0 ENVIRONMENTAL DOCUMENT TEXT

6.1 TEXT FOR INCLUSION IN THE ENVIRONMENTAL DOCUMENT

California High-Speed Train Stations

Stations are the points of entry for passengers into the California High-Speed Train system and will dramatically influence their travel experience. Significant effort will be made to ensure station safety, quality, user-friendliness, durability, and expression of the California High-Speed Train image. Up to twenty-four stations are being planned to serve California's metropolitan areas.

Design Parameters. During early planning and design of the CHST stations, clear articulation of its intended purpose, context, presence and image are fundamental to developing an appropriate design solution for each of the stations across California.

(RC to examine these fundamental station parameters and collaborate with local communities and stakeholders to develop an architectural program in order to articulate station design objectives and by which design proposals may be evaluated.)

Station Context. Each station will be responsive to the unique characteristics of its immediate environment. Categories of station types along the HST alignment include:

- Global Center Station: located in densely populated economic centers
- Regional Center Station: located in a regional hub close to a global center
- City Center Station: located in an established, lower density urban downtown
- Suburban Center Station: located in a diverse, newer, outlying suburb
- Town Center Station: located in a small city which draws from regional centers

(RC to identify station type or types that might apply to stations in their section. See TM 2.2.3.)

Local Input. All stations will be designed with extensive community input and to respond to the unique design parameters at each site. However, architectural treatment and approach will vary based on partnership with local agencies. All stations will be designed and constructed to meet goals of design excellence and recognize local context as well as meet functional requirements of the high-speed train system. At a minimum, stations will be enclosed in a unique but architecturally reserved skin, conveying architectural subtlety while featuring striking interior spaces.

Local agencies desiring a more dynamic and impactful level of architecture may chose to partner to develop an architecturally 'iconic' station. Any station could be classified an iconic station and may be characterized by a sense of prominence on the site, architectural expressiveness, exhilarating passenger experience, organize or curvilinear forms, unique detailing and/or uncommonly rich materials.

(RC to describe and include representative 'functional' and 'iconic' station designs as described in NTD No. 002 – Guidance on Functional Station Design to Support the Environmental Documents)

Development. HST stations may encourage higher density development, a mix of land uses and housing types, compact pedestrian-oriented design, context-sensitive building design that considers relation to public spaces, and limits on the amount of parking. As outlined in the Project's Station Parking Policy, the demand for station parking and its associated impacts will be fully evaluated as part of this EIR/EIS assessment.

(RC to add any unique development considerations by station)

Access. Access to stations is a prime consideration in locating and positioning a station. CHST passengers need clear and direct access from local thoroughfares to the high-speed train station via feeder streets. Passengers may arrive by various modes of transportation including light rail, bus, taxi, private car, bicycle, on foot as well as other modes of rail travel at selected stations.

(RC to modify the above statement to reflect travel modes appropriate for stations in their section)

(RC to identify the major local thoroughfares that lead to the proposed stations in their section)

Size. Station size and architectural presence will vary from station to station; each will be sized to accommodate the projected ridership, frequency of trains during peak times, and anticipated surges of passengers during special events. Station footprint and height are influenced by numerous technical factors including train length, platform type and number, number of tracks, terminal or intermediate station operation, vertical configuration, patronage, fare collection, interchange with other transit systems, commercial provisions and site context.

(For each station alternative, RC to identify general size of station footprint in terms of square footage with a reference to any figures showing the general concept/plan for stations in their section. The concept/plan should also include the areas required for access and traffic circulation.)

Components. Basic station components include platforms, concourses and entrances. A standard 1,410-foot platform length, sized to accommodate the maximum length of a high-speed train, may be configured in three ways relative to street level: elevated, at-grade or underground. The platform configurations investigated for each station consider function, alignment, interfaces with existing and proposed infrastructure, operational factors, safety considerations, environmental impact and cost.

The concourse will accommodate public passenger functions such as ticketing, meeting and greeting, waiting, passenger and staff circulation, fare collection, and vertical circulation. Non-public staff spaces and facilities will support station operation as well as train operation. These include operations offices, station building service and standard plant spaces, HST system facilities and other ancillary spaces. Facilities range from ticket processing and train crew locker rooms to electrical substations, generators, fuel storage tanks, and chiller plants. While most of these facilities will be located within the station envelope, some may be located elsewhere on the station site. End stations function as terminals and have more extensive public and non-public space needs than those of intermediate stations.

Stations should be designed to reflect the principles of CPTED (Crime Prevention through Environmental Design) including defensible space, natural surveillance, natural access control, and territorial reinforcement. Stations will have monitoring systems including seismic, climatic, CCTV and intrusion detection. Station infrastructure, including lighting, mechanical, electrical and power, and fire protection, will be designed with safety and security measures.

(RC to identify station configurations assessed, including concourse location, for each station in their section.)

Safety. Safety of patrons and staff is the first priority in station design. Stations will be closed and secured outside of normal revenue hours. Care will be taken to enclose all portions of stations at ground level and provide access only to authorized staff and emergency personnel during this time. Stations will be designed in accordance with National Fire Protection Association (NFPA) 130. Accordingly, emergency response to a station emergency event will be according to a pre-approved emergency plan.

(If any, RC to identify issues for their station locations that represent a unique safety concern)

Lighting. The station and site, including parking, approaches, landscaping, signage and entrances will be lighted for passenger safety in accordance with project technical standards and California Code of Regulations Title 24. Lighting of public areas will be sensitive to adjacent buildings while minimizing objectionable glare. Station interior lighting will be energy-efficient and designed to create an inspiring and inviting station presence while accentuating activity areas where adequate lighting is critical to passenger safety and comfort, including areas of fare collection, decision points, vertical circulation and platform edges.

(If any, RC to address any uniquely sensitive receptors adjacent to their stations that might be affected by a CHSTP lighting plan)

Noise Mitigation. Noise and vibration generated by trains, patrons, external sources, and building systems will be controlled and reduced through quality station design. Appropriate mitigations will be considered both inside the station and adjacent to it.

(If any, RC to include any generators of noise and vibration adjacent to their stations, other than the CHSTP system, that might affect the station design)

Trackways. Architectural station design does not stop at the ends of platforms. Beyond the ends of elevated platforms, the trackway and supports will be considered significant design elements and will be designed with attention to architectural detail while satisfying critical structural criteria.

(RC to identify which of their stations will require elevated trackways approaching the station including general reference to height and width of structures. Additional detail on the elevated trackwork should be addressed in other sections of the EIR/S)

Sustainability. The California High-Speed Rail Authority is committed to building a high-speed train system that minimizes impacts to the natural and built environment, encourages compact land development around transit stations, and helps California manage pressing issues including climate change, traffic and airport congestion, and energy dependency. CHSTP stations and corresponding sites will be planned, designed, constructed and operated at a LEED 'Silver' or better standard in line with state policy.

(No additional text is required by the RC)

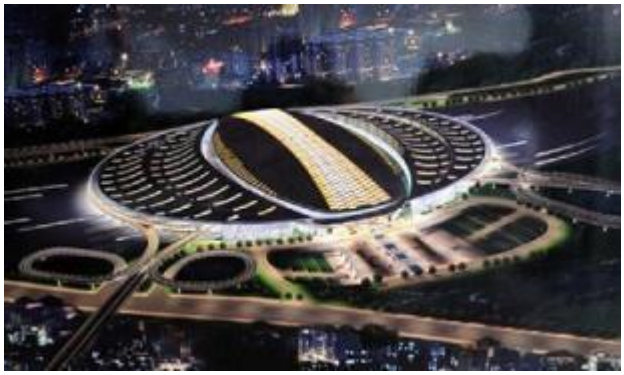
APPENDIX A: STATION IMAGES

The aforementioned station categories are illustrated in the following photographs from various high-speed rail stations existing in Europe and Asia.

Global Center Station: These stations are located within centers of economic and cultural activity. Global centers are regional downtowns and are characterized by a high-density mix of housing, employment, retail and entertainment that cater to the regional market. The area is served by a mix of transit modes that support this activity, including high-capacity regional rail and bus, and local buses.

The following images illustrate Global Center Stations:

Berlin, Germany



Beijing, China

Paris, France

Nagoya, Japan

Seoul, South Korea

Regional Center Station: These stations are primarily located in regional hubs which are somewhat less prominent than global centers. Regional centers typically evolved from suburban edge cities, are located within larger metropolitan areas and are centers of regional commute patterns. Regional Center Stations are well connected to global centers and other destinations within the region, and are served by a mix of transit modes including regional rail, light rail and bus services.

The following illustrate Regional Center stations.

Taichung, Taiwan

Cologne, Germany

Zaragoza, Spain

Nagasaki, Japan

Yong San, South Korea

City Center Station: These stations serve centers outside major metropolitan regions, and are established urban areas with traditional grid-based downtowns. They contain a mix of residential, employment, retail and entertainment uses, usually at slightly lower densities and intensities than regional centers. They are employment centers and are served by multiple transit options, often high-frequency regional bus or bus rapid transit as well as local buses. Many city centers retain their historic character, having preserved both historic buildings and street networks.

The following images illustrate City Center stations:

Lyon, France

Marseille, France

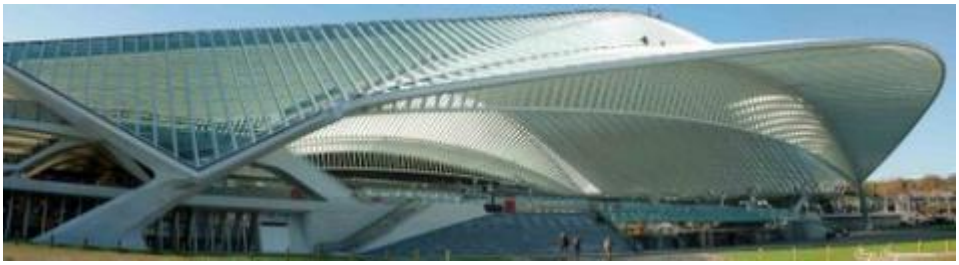
Zuoyong, Taiwan

Kokura, Japan

Hanover, Germany

Suburban Center Station: Suburban Center Stations are located in areas which contain a mix of residential, employment, retail and entertainment uses, usually at intensities similar to that found in city centers but lower than that in regional centers. Suburban centers are typically connected to the regional transit network and include a mix of transportation types ---regional rail and bus, bus rapid transit, and local bus --- with high-frequency service. Development in suburban centers surrounding station sites may be more recent than that found in city centers, and there are more single-use employment areas and residential neighborhoods.

The following images illustrate Suburban Center Stations:



Liege, Belgium

Ciudad Real, Spain

Shin Yatsushiro, Japan

Kakegawa, Japan

Chiayi, Taiwan

Town Center Station: Town Center Stations are located in traditional towns or small cities which are on the fringes of large metropolitan areas. Town centers are not urban in character and have a smaller employment base. These centers are beginning to attract residential and commercial growth from the larger metropolitan region. Town Center Stations are generally served by express or local bus services, and may be connected by commuter rail to the global and regional centers.

The following images illustrate Town Center Stations:

South Korea

Valence, France

Tarragona, Spain

Mishima, Japan

Hsinchu, Taiwan

Station Lighting

The presence of a high-speed rail station at night is no less important than during daylight hours. The station site, including parking, approaches, landscaping, signage and entrances must be well-lighted for passenger safety, both real and perceived. Lighting of public areas must be sensitive to adjacent buildings while minimizing objectionable glare. Station interior lighting will be energy-efficient and designed to create an inspiring and inviting station presence when viewed from the exterior. Interior lighting will accentuate activity areas in which adequate lighting is critical to passenger comfort, including areas of fare collection, concourse decision points, vertical circulation and platform edges. Lighting sources will be carefully selected to be energy-efficient while blending with the prevailing public lighting within the neighborhood.

The following images illustrate lighting approaches used in international high-speed train stations:

Taichung, Taiwan

Lyon, France

Berlin, Germany

Kyoto, Japan

Liege, Belgium